

1.0 GENERAL

1.1 Scope

- 1.1.1 The work shall consist of the construction, renovation or the adjustment of manholes and/or catchbasins as detailed on the plans or where designated by the Engineer in the field. Should the Contractor wish to propose alternate materials or methods, details must be submitted and approved in writing to the Engineer before proceeding.

1.2 Related Sections

- 1.2.1 Section 02315 – Trench Excavation and Backfill
1.2.2 Section 02051 – Facilities Abandonment
1.2.3 Section 02500 - Supply of Portland Cement Concrete

2.0 PRODUCTS

- Use only those products in the Approved Products List, Product ID:
- SP – 04: Standard Manhole Frame and Covers
 - SP – 05: Oversized Manhole Frame and Covers
 - SP – 06: Catch Basin (rolled curb on low point or continuous grade)
 - SP – 07: Catch Basin (barrier curb on low point or continuous grade)
 - SP – 08: Catch Basin Frame and Covers (Non-Standard)
 - SP – 09: Catch Basin Frame and Cover in Easements
 - SP – 10: Catch Basin Frame and Cover for Bus Routes and Arterial Streets
 - SP - 11: High Capacity Catch Basin Frame and Cover

2.1 Precast Manhole or Catchbasin Units

- 2.1.1 Designed and constructed to the requirements of ASTM C478 with dimensions shown on the drawings and/or as designated by the Engineer in the field. Cement shall be Type HS Sulphate Resistant Portland Cement meeting CAN/CSA-A3000.
- 2.1.2 Minimum wall thickness shall be as per ASTM C478.
- 2.1.3 All manhole sections shall have single offset or grooved "O" ring rubber gasket joints manufactured in accordance with the provisions of ASTM C443. A rubber gasket shall be provided with each manhole section which is supplied.
- 2.1.4 Where PVC pipes penetrate domestic manholes, flexible gaskets shall be provided. Flexible gaskets will be factory installed as often as reasonably practical and field installed when necessary. Flexible gaskets shall conform to ASTM C923M, Standard Specification for Resilient Connectors between Reinforced Concrete Manhole Structures, Pipes, and Laterals (Metric).

- 2.2 Frames and Covers
 - 2.2.1 Close-grained grey cast iron meeting ASTM A48, Class 20 or cast steel conforming to ASTM A27, Grade 70-36. The substitution of ductile iron meeting ASTM A395 for cast iron or cast steel shall be subject to the approval of the Engineer.
 - 2.2.2 All frames and covers shall be true in form and dimension, free from faults, sponginess, cracks, blow holes, and other defects. Bearing surfaces shall be machined to prevent rocking.
 - 2.2.3 Frames and covers shall be bitumen coated by dipping.
 - 2.2.4 All manhole covers shall have only one vent hole.
- 2.3 Manhole Steps
 - 2.3.1 Shall be aluminum, conforming to the requirements of ASTM C478M.
- 2.4 Concrete (Cast-In Place)
 - 2.4.1 Concrete shall conform to Section 2500 for Supply of Portland Cement Concrete and the following:
 - .1 Type of Cement: Type HS Sulphate Resistant Portland Cement
 - .2 Specified Strength: 30 MPa
 - .3 Air: $6.5 \pm 1\%$
 - .4 Maximum water/cementing materials ratio: 0.50
 - .5 Specified Slump: $70 \text{ mm} \pm 10 \text{ mm}$
 - 2.4.2 Details for reinforcing to be used in cast-in-place concrete shall be submitted and approved by the Engineer prior to construction.
- 2.5 Mortar
 - 2.5.1 Shall consist of one (1) part Type HS Sulphate Resistant Portland Cement to three (3) parts clean sharp sand, mixed dry. Sufficient water shall be added after mixing to give optimum consistency for placement. No additives shall be used.
- 2.6 Grade Adjustment Rings
 - 2.6.1 Concrete grade rings shall be manufactured to ASTM C478.
 - 2.6.2 Rubber composite grade rings shall be flat or tapered, round or rectangular, made from molded recycled rubber rated for exposure to -40°C .

3.0 EXECUTION

- 3.1 Manholes & Catchbasins
 - 3.1.1 All manholes and catchbasins shall be constructed in accordance with the appropriate Standard Drawings and the latest edition of the *Occupational Health and Safety Act & Regulations*. Unless otherwise specified, the type

of manhole used shall be the standard manhole. The exact location of manholes and catchbasins shall be indicated by the Engineer in the field.

- 3.1.2 Where no road grades exist for the location at which the sewer is being constructed, the elevation of rims will be indicated on the design plans and/or grade sheet. The manhole or catchbasin shall then be constructed such that the rim elevation will conform accurately to the elevation specified. Manhole frames of the non-floating type shall be centered over the manhole and set level within 15 mm of correct grade. Manhole frame is to be set to match proposed roadway cross slopes as directed.
 - 3.1.3 Placement of catchbasins shall be completed prior to the installation of curb and gutter or monolithic walk, curb and gutter.
 - 3.1.4 Where manholes are being rebuilt, constructed, raised or lowered, and/or adjusted in conjunction with pavement surface construction or renewal, manhole frames shall be placed in accordance with Section 2350 - Specification for the Placement of Asphaltic Concrete Surface.
 - 3.1.5 Support pipes at manholes and catchbasins to prevent shearing or settlement. Where not detailed use concrete fill, concrete or timber beam, suitable compacted gravel or site material as approved by the Engineer. During construction, plug pipes at manholes and catchbasins to prevent entry of concrete and mortar. Remove plugs immediately after construction is completed.
 - 3.1.6 Manholes shall be constructed to details shown on Standard Drawings.
 - 3.1.7 Precast concrete grade riser rings shall be used to raise the manhole or catch basin frame and cover to the finished grade. The height of grade rings shall limited to 600 mm, unless approved by the Engineer. Bricks may be used to support or make final adjustments to frame and covers. No more than three (3) layers of bricks shall be used.
 - 3.1.8 All sections of the catchbasin or manhole shall be bonded together with mortar. Manhole rungs shall be firmly embedded in the manhole structure approximately 400 mm on centre vertically and shall be staggered 300 mm on centre. If 400 mm wide rungs are used, the rungs shall be positioned in line.
- 3.2 Renovation of Existing Manholes and Catchbasins
- 3.2.1 Abandonment
 - .1 During the course of construction it may be required that existing catchbasins may have to be abandoned. Abandonment of catchbasins and manhole shall be completed in accordance with Section 02051 Facilities Abandonment. Salvageable material shall be returned to the City Yards. If the connection is no longer required, it shall be blocked and the catchbasin backfilled.

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- .2 If the connection is to remain as a live connection, it shall be extended through the barrel portion of the catchbasin and a stub constructed on the opposite side for future extension.
 - .3 Backfilling of the catchbasin barrel shall be made with a low shrink (non-shrink) backfill material, when native backfill material cannot be compacted adequately to specifications to subgrade elevation.

3.2.2 Adjustment

- .1 For any adjustments less than 75 mm, use rubber rings. Adjustments greater than 75 mm shall be precast concrete riser rings.
- .2 All tops shall be firmly set into position at the required elevation and grouted. Re-setting disturbed grouting and change of rim elevations of less than one course of brickwork or less than one riser ring, even though required by the Engineer, is not considered an adjustment. An adjustment does not include the removal or addition of batter blocks, manhole blocks or riser rings.
- .3 It will be the responsibility of the Contractor to bring all manholes and catchbasins to the finished grade elevation designated by the Engineer. The manhole shall show no depressions or bumps exceeding 5 mm under a straight edge three 3 m (minimum) long, placed parallel to the road centre line.
- .4 Manhole frames shall be placed level with the road surface in accordance with Clause 3.1 Manholes & Catchbasins of this specification.
- .5 The cost of renovating manholes or catchbasins damaged as a result of the Contractor's operations shall be borne by the Contractor.

3.2.3 Raising and Lowering

- .1 Raising of manholes and catchbasins shall be done in accordance with the standard specification for construction. The Contractor shall be responsible for locating all manholes and catchbasins that require raising.
- .2 Where lowering of an existing manhole or catchbasin is required, the Contractor shall remove the frame, cover and any bricks, blocks or rings necessary to lower the manhole or catchbasin to a level where there is no danger of the manhole or catchbasin being damaged during excavation, compaction, grading or paving operations.
- .3 An approved steel cover shall be placed over the manhole or catchbasin until the manhole or catchbasin can be raised to its final elevation.

- .4 Salvageable material shall be returned to the City yards.
- .5 Manhole frames shall be placed level with the road surface in accordance with clause 3.1 Manholes & Catchbasins of this specification.

3.2.4 Reconstruction

- .1 The existing rim, bricks, blocks, and base shall be removed and a new manhole or catchbasin constructed in accordance with the standard specifications for construction.
- .2 Manhole frames shall be placed level with the road surface in accordance with clause 3.1 Manholes & Catchbasins of this specification.

3.2.5 Changing Manhole and Catchbasin Frames and Covers

- .1 Floating type frames and covers shall be supplied and installed on all existing manholes in paved surfaces. When replacing existing frames and covers with floating type, the top rows of bricks shall be removed and replaced with a precast concrete lift ring (barrel). This will allow for proper fit of the frame within the barrel of the manhole.
- .2 Side inlet style frames and covers shall be supplied and installed where an existing catchbasin barrel alignment allows the installation of the side inlet style.